Amendments to the Claims:

1. (Previously presented) A method comprising:

acquiring first modality image data while an imaged object moves over a range of motion and reconstructing the first modality image data into a motion artifacted first modality image;

acquiring second modality image data and reconstructing the second modality image data into second modality images which represent the object in respective states of motion with as few motion artifacts as possible;

from the second modality images, determining a motion model which characterizes states of motion assumed by the object while moving through the states of motion;

forming an intermediate image of the object from the motion model and the second modality images, the intermediate image representing the object as if it had moved during the acquiring of the second modality image data over the range of motion over which the object moved as the first modality imaging data was acquired;

forming a combination image from the intermediate image and the first modality image.

2. (Previously presented) A method of enhancing a first image of a moving object, the first image containing motion artifacts, the method including:

a. acquiring further images that represent the object in respective states of motion with as few motion artifacts as possible;

b. from the further images, determining a motion model that characterizes the states of motion assumed by the object;

c. focusing the first image by means of the motion model.

3. (Previously presented) A method of enhancing information contents of a first image of a moving object, to be reconstructed from projections acquired as the object moves over a plurality of states of motion and containing motion artifacts, which method includes:

a. acquiring further images that represent the object in at least two of the states of motion with as few motion artifacts as possible;

b. from the further images, determining a motion model that characterizes the states of motion assumed by the object while the projections are acquired;

c. forming at least one intermediate image of the object from the motion model and the further images, the at least one intermediate image representing one or more of the states of motion assumed by the object while the projections are acquired;

d. reconstructing the first image from the projections of the object and the at least one intermediate image.

4. (Previously presented) The method as claimed in claim 1, wherein determining the motion model includes:

determining a respective motion vector field for parts of the object.

5. (Previously presented) The method as claimed in claim 1, wherein forming the intermediate image includes:

forming other images of other states of motion of the object from the second modality image data;

weighting and subsequently superimposing the other images and the second modality images in conformity with a frequency at which each of the other states of motion were assumed by the object while moving over the range of motion while the first modality image data was acquired.

6. (Previously presented) The method as claimed in claim 1, further including:

elastically registering the intermediate image and the first modality image prior to the formation of the combination image.

7. (Previously presented) The method as claimed in claim 1, further including:

focusing the combination image.

8. (Previously presented) The method as claimed in claim 2, further including:

registering the focused image and at least one of the further images; and

forming a combination image from the focused first image and the at least one of the further images.

9. (Previously presented) The method as claimed in claim 1, wherein the first modality image is one of a positron emission tomography (PET) image or a single positron emission computed tomography (SPECT) image and the second modality images are one of computed tomography (CT) images and magnetic resonance (MR) images.

10. (Previously presented) An image processing system which includes a data processing unit for carrying out the method as claimed in claim 1.

11. (Previously presented) A medical examination apparatus, the apparatus including:

a device for forming images or projections by means of a first imaging method;

a second device for forming images or projections by means of a second imaging method;

an image processing system that includes a data processing unit for carrying out the method as claimed in claim 1.

12. (Currently amended) A computer readable medium containing instructions for controlling a data processing unit in such a manner that the data processing unit can carry out the method as claimed in ~~claim 1~~ claim 1.

13. (Previously presented) The method as claimed in claim 2, wherein determining the motion model includes:

determining a respective motion vector field for parts of the object.

14. (Previously presented) The method as claimed in claim 3, wherein determining the motion model includes:

determining a respective motion vector field for parts of the object.

15. (Previously presented) The method as claimed in claim 2, further including:

forming additional images of others of the states of motion of the object from the further images and the motion model;

weighting and subsequently superimposing the other images and the second modality images in conformity with a frequency at which each of the other states of motion were assumed by the object while moving over the range of motion over which the first modality image data was acquired.

16. (Previously presented) The method as claimed in claim 3, further including:

forming additional images of others of the states of motion of the object from the further images and the motion model;

weighting and subsequently superimposing the other images and the second modality images in conformity with a frequency at which each of the other states of motion were assumed by the object while moving over the range of motion at which the first modality image data was acquired.

17. (Previously presented) The method as claimed in claim 2 wherein the first image is a positron emission tomography (PET) image or a single positron emission computed tomography (SPECT) image and the further images are one of computed tomography (CT) images and magnetic resonance (MR) images.

18. (Previously presented) The method as claimed in claim 3 wherein the first image is a positron emission tomography (PET) image or a single positron emission computed tomography (SPECT) image and the further images are one of computed tomography (CT) images and magnetic resonance (MR) images.

19. (Previously presented) A method of motion compensation comprising:

acquiring a first sequence of image data of a moving object by a first imaging modality data acquisition system;

acquiring a second sequence of image data of the moving object by a second imaging modality data acquisition system;

determining a motion model related to periodic motion of the object based on the second sequence of image data;

using the determined motion model, generating from the first sequence of image data a first modality image data set in a selected motion state.

20. (Previously presented) The method as claimed in claim 19, further including:

generating a combined image data set in the selected motion state from the first modality image data set and a second modality image data set in the selected motion state.

21. (Currently amended) The method as claimed in claim 19, wherein the first imaging modality data acquisition system includes one of a positron emission tomography (PET) ~~PET~~ system and a single positron emission computed tomography (SPECT) ~~SPECT~~ system.

22. (Currently amended) The method as claimed in claim 19, wherein the second imaging modality data acquisition system includes a computer tomography (CT) system, [[and]] an ultrasound system, or a fast magnetic resonance (MR) tomography system.

23. (Previously presented) The method as claimed in claim 19, further including:

registering coordinates systems of the first and second imaging modality data acquisition systems.

24. (Cancelled)

25. (Previously presented) The method as claimed in claim 19, further including:

sensing motion of the object at least during acquisition of the second sequence of imaging data.

26. (Previously presented) The method as claimed in claim 25, wherein the sensed motion is a cyclic motion in which the object cyclically assumes each of a plurality of motion states.

27. (Currently amended) The method as claimed in claim 19, wherein the motion ~~mode~~ model includes a motion vector field which indicates movement between at least two motion states.

28. (Currently amended) An imaging system comprising:

a first imaging modality data acquisition system for generating a first imaging modality sequence of image data;

a second imaging modality data acquisition system for generating a second imaging modality sequence of image data;

a motion sensor for sensing object motion;

a processor for determining a motion model from the sensed motion and the second modality ~~sequency~~ sequence of image data.

29. (Previously presented) The imaging system as claimed in claim 28, wherein the motion model characterizes motion states assumed by the object while moving among a plurality of motion states.

30. (Previously presented) The imaging system as claimed in claim 28, further including:

operating mathematically with the motion model to transform the first imaging modality image data to a selected motion state.

31. (Previously presented) The imaging system as claimed in claim 28, wherein the first imaging modality data acquisition system is a PET system and the second imaging modality data acquisition system is a CT system.

32. (Previously presented) A method for motion corrected imaging comprising:

generating image data using a first imaging modality;

generating a plurality of images using a second imaging modality;

from the second imaging modality images and sensed motion of an imaged object, generating a motion model;

operating on the first modality image data with the motion model to create a first modality image in a selected motion state.

33. (Previously presented) The method as claimed in claim 32, further including:

combining the first modality image in the selected motion state with a second modality image in the selected motion state.

34. (New) The method as claimed in claim 25, wherein the sensed motion is a periodic motion in which the object periodically assumes each of a plurality of motion states.